ENVIRONMENT DETECTION SYSTEM

FIELD OF THE INVENTION

[0001] The present invention relates to an environment detection system. More specifically, the present invention relates to a method and apparatus for determining environmental conditions suitable for growing plant life.

BACKGROUND OF THE INVENTION

[0002] In the past, plant enthusiasts have relied on books or horticulturalists to know the environmental conditions in which certain plants could grow. These conditions include geographic location, the amount of sunlight, temperature, and the amount of moisture in the ground. Excluding the geographic location, these conditions change frequently. For example, the amount of sunlight and the temperature in an area changes as the season changes. Furthermore, both temperature and sunlight change as the day progresses. These frequent changes make monitoring the conditions of the planting location very difficult to do by inspection.

[0003] Not knowing the precise environmental conditions of a specific planting location can cause a few problems. First, the vegetation the planter chooses may not survive in the area. Second, if planted in the wrong area, some plants will overtake other vegetation growing in that area. Third, the planter can experience some frustration in having to constantly spend money trying to find the right plants for growing in a particular area.

[0004] These problems give rise to a much needed solution. An apparatus that is capable of accurately determining certain geographical conditions, and a method thereof, that would reduce the problems and frustration of planting vegetation in a specified area.

SUMMARY OF THE INVENTION

[0005] The present invention relates to an apparatus for detecting a plurality of environmental conditions utilizing a housing unit having a plurality of sensors, sensing, for example, sunlight, temperature, and moisture of an area to be landscaped. The housing unit further includes a battery and a memory storage device. A circuit board is electrically connected to the plurality of sensors, the battery, and the storage device, and is contained within the housing unit. The moisture sensor is provided in the form of a moisture probe. The moisture probe is physically connected to the housing unit, and electrically connected to the circuit board.

[0006] The present invention further relates to a method of determining vegetation capable of thriving in a plurality of environmental conditions, comprising the steps of sensing the plurality of environmental conditions with an environment detection apparatus, storing the plurality of environmental conditions on a memory storage device, and downloading the plurality of environmental conditions to a database, wherein the database displays a list of vegetation capable of surviving in the sensed environmental conditions.

[0007] Finally, the present invention relates to a control system for using an environment detection apparatus as an activation device for a sprinkler system comprising at least one sensor for determining at least one environmental condition, at least one logical operation producing an output to an actuator based on the at least one environmental condition, and the actuator activating the sprinkler system based on the output of the at least one logical operation.

[0008] Further areas of applicability of the present invention will become apparent from the detailed description provided hereinafter. It should be understood that the detailed description and specific examples, while indicating the preferred embodiment of the invention, are intended for purposes of illustration only and are not intended to limit the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The present invention will become more fully understood from the detailed description and the accompanying drawings, wherein:

[0010] Figure 1 is a plan view of a preferred embodiment of an environment detection apparatus constructed in accordance with the present invention;

[0011] Figure 2 is a plan view of an alternative embodiment of an environment detection apparatus constructed in accordance with the present invention;

[0012] Figure 3 is a schematic diagram of a control system of an environment detection apparatus constructed in accordance with the present invention; and

[0013] Figure 4 is a plan view of an alternative embodiment of an environment detection apparatus constructed in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] The following description of the preferred embodiment(s) is merely exemplary in nature and is in no way intended to limit the invention, its application, or uses.

[0015] Figure 1 depicts an environment detection device 10. Environment detection device 10 reads various signals from various sensors based on the environmental conditions surrounding device 10. The sensors are contained within a housing unit 12. Additionally, housing unit 12 contains a battery 14, a circuit board 16, and a memory storage device 18 that is accessible in housing unit 12 by a user.

[0016] The first sensor in housing unit 12 is a light sensor, such as an ultraviolet sensor 20. Ultraviolet sensor 20 is placed in housing unit 12 in such a way that it is able to receive sunlight. For the preferred embodiment, housing unit 12 has a clear top portion 21, allowing light to travel to ultraviolet sensor 20. Furthermore, ultraviolet light sensor 20 is preferably positioned at the top of housing unit 12 to ensure that it can accurately register any amount of light in the area. Those skilled in the art recognize an ultraviolet sensor 20 is well known.

[0017] The next sensor is a temperature sensor, such as a digital thermometer 22 for detecting the temperature of the surrounding area. Additionally, a timer, such as a digital clock 24 interfaces with circuit board 16. Those skilled in the art recognize that thermometer 22 and clock 24 are well known, and widely used components.

[0018] The fourth sensor is a moisture probe 26. Moisture probe 26 measures the amount of conductivity in the ground. More moisture in the ground, for example, means more water in the ground. This lowers the electrical resistance of the ground, thus raising the ground's conductivity. Although the preferred embodiment shows two moisture probes 26, any number could be used depending on the size of the area being measured.

[0019] The sensors are connected to circuit board 16. Circuit board 16 processes the data received by the sensors by means of a microprocessor, and routes the information to a memory storage device (memory) 18. Memory 18 connects to device 10 through any number of different protocols, such as a universal serial bus (USB) connection, to allow easy removal and transfer to a computer. Many different memory storage devices 18 are available, including USB removable flash memory devices better known as jump drives to those skilled in the art.

[0020] Once the data from the sensors has been acquired and downloaded to memory 18, the user removes memory 18 from device 10 and connects it to a computer. Alternatively, device 10 may contain a wireless transmitter to transmit the data from the sensors to a wireless receiver connected to a computer. Either method delivers the data collected by the sensors to a database

on the computer at step S1 in Figure 5. This processor prompts the user for various inputs, such as data group name S2 and geographic location S3. The processor then determines the plants meeting the sensed conditions (light, moisture, etc.) and geographic location. The user then inputs the general types of vegetation desired (e.g., plants, shrubs, trees (deciduous or evergreen), flowers (annuals or perennials) S5, SD. The database then analyzes the data recorded from the sensors to provide a list of vegetation that can thrive in those conditions S7. Other restrictions or parameters can be provided for limiting or narrowing down the list of vegetation, including height, width restrictions, color, type of soil, and other conditions.

[0021] According to another aspect of the present invention, the device 10 includes a global positioning satellite (GPS) system receiver 28 connected to circuit board 16 in addition to the other sensors. The benefit to using GPS system receiver 28 is that it is capable of determining the time, location, and temperature with decent accuracy. GPS receivers, in general, receive signals from a series of satellites orbiting the earth to acquire various data. Typically, GPS receivers are used to determine specific global coordinates, future weather forecasts, and any other information broadcast from the satellites. Additionally, many GPS receivers include on-board thermometers and clocks that operate similarly to those well known in the art. Therefore, GPS system receiver 28 may eliminate the user from having to input geographical location information into the database, as well as performing the function of the thermometer 22 and clock 24.

[0022] Device 10 stores various data helpful in planting future vegetation, however, this data can also be useful for watering the vegetation after it has been

planted. Figure 2 shows a control system 30 using device 10 as means to actuate a sprinkler system.

[0023] First, the data collected from the sensors acts as inputs 32 to the control system 30. This data includes a sunlight intensity reading 20, a date and time reading 24, a temperature reading 22, and a moisture reading 26. These inputs travel along data lines 34 to the microprocessor on circuit board 16. The microprocessor analyzes the inputs 32 by using a series of "If/Then" logic statements 36 to determine if the vegetation needs to be watered. If the logic statements 36 determine watering is necessary, an output signal is sent to an actuator 38, which activates the sprinkler system.

[0024] Although thermometer 22 and clock 24 could be used as the sensors to collect the temperature and time reading, respectively, GPS system receiver 28 would be more beneficial in terms of device 10 actuating a sprinkler system. GPS system receiver 28 could determine the temperature and time, as well as receive future weather forecasts. This information would be useful when determining whether or not to water the vegetation. For example, if it is determined based upon the moisture reading that the vegetation needs to be watered, an "If/Then" logic statement 36 may be included that follows the following pattern: "if" the forecast equals "rain," "then" delay actuation of the sprinkler system. Other time constraint type "If"/"Then" logic statements 36 are implemented in case the forecast of "rain" is incorrect and therefore, the time constraint type "If"/"Then" logic statements 36 limit the amount of time that expires prior to watering of the vegetation. With this type of system, a more efficient sprinkler system is provided.

[0025] Referring now to Figure 3, device 10 is powered by either rechargeable or non-rechargeable batteries 14. For rechargeable batteries 14, device 10 employs a charging caddy 40 that connects to device 10 through moisture probes 26. Charging caddy 40 further connects to a wall outlet by means of a plug 44. As shown in Figure 4, charging caddy 40 has a built in rectifier 46 to convert an AC voltage from wall outlet 42 to a DC voltage to charge batteries 14, as well as additional circuitry and components to charge the batteries, which is well known in the art.

[0026] Furthermore, device 10 may contain solar cells 48 to relieve a portion of the energy drain on batteries 14 while device 10 is located outside in sunlight. Solar cells 48 use sunlight to power device 10, relieving battery 14 of having to supply all the power. This allows device 10 to be placed outside for longer periods of time, thus allowing device 10 to collect more data.

[0027] The description of the invention is merely exemplary in nature and, thus, variations that do not depart from the gist of the invention are intended to be within the scope of the invention. Such variations are not to be regarded as a departure from the spirit and scope of the invention.